06-26-00

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Title of Invention	SYSTEM AND METHOD FOR MAINTAINING TEXT FORMATTING CONSISTENCY WITHIN AN ELECTRONIC DOCUMENT
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Attorney Docket	13237-2715
Express Mail Label No.	EL561433193US MS #149441.1

Jc814 U.S. PTO 09/602247 06/23/00

JC714 U.S. PTO 09/602247 06/23/00

APPLICATION ELEMENTS

1. ☐ Fee Transmittal Form *(Submit an original, and a duplicate for fee processing)*
2. ☒ Specification, Claims, and Abstract — Total Pages 25
3. ☒ Drawings — Total Sheets 7
4. Oath or Declaration — Total Pages
   a. ☐ Newly executed (original or copy)
   b. ☐ Copy from prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 17 completed)*
   [Note Box 5 Below]
   (i) ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation by Reference *(usable if Box 4b is checked)* The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program *(Appendix)*
7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. ☐ Computer Readable Copy
   b. ☐ Paper Copy (identical to computer copy)
   c. ☐ Statement verifying identity of above copies

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ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment:
   a. ☐ Assignment Papers (cover sheet & document(s))
   b. ☐ Assignment is of record in parent application No. _____
9. ☐ 37 CFR 3.73(b) Statement *(when there is an assignee)*
   ☐ Power of Attorney by assignee
10. ☐ English Translation Document *(if applicable)*
11. ☐ Information Disclosure Statement (IDS) PTO-1449
    ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
14. ☐ Small Entity Statement(s)
    ☐ Statement filed in prior application Status still proper and desired
15. ☐ Certified Copy of Priority Document(s)
16. ☐ Other: _____

17. If a **CONTINUING APPLICATION**, *check appropriate box and supply the requisite information:*
☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No:
Recite complete dependency back to first parent application: _____

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SYSTEM AND METHOD FOR MAINTAINING TEXT FORMATTING CONSISTENCY WITHIN AN ELECTRONIC DOCUMENT

TECHNICAL FIELD

The present invention relates to a system and method for managing text formatting within an electronic document and more particularly relates to a system and method for monitoring and enhancing the consistency of text formatting within a document.

BACKGROUND OF THE INVENTION

Users of word processors and other document editors such as Microsoft Word commonly apply formatting to text within a document. Formatting provides a means for emphasizing text or differentiating one kind of text from another. Direct formatting is a conventional means for applying formats (e.g., bold face, italics, underlining) directly to text. Direct formatting involves a user selecting a portion of text within a document and then selecting a format to be applied to that text.

Another means for applying formatting to text is through the use of styles. A style is simply a set of formatting characteristics that can be applied to text and are grouped as a set. The style can be named, so that the set of formatting characteristics can be referred to with a single style name. For example, a "Header" style may include the following formatting characteristics: bold, font size 24, center justification, line spacing 2.0. Similarly, a style entitled "Body Text" may include formats such as not bold, not italics, point size = 12, left and right justified, line spacing = 1.0.

Unfortunately, for various reasons, many users find styles difficult to use. Moreover, even when users do utilize styles, it is typical that they will use styles inconsistently and will mix styles with direct formatting inconsistently. Because maintaining consistent formatting is essential in making documents look professional, there is a need in the art for a means for analyzing a document to determine the consistency of formatting whether by direct formatting or by the use of styles.

SUMMARY OF THE INVENTION

The present invention solves the problems of the prior art by providing a system and method for monitoring and enhancing the consistency of text formatting within a document. The present invention is comprised of four main components. The first component is the Format Consistency Checker (FCC). The FCC functions to build and maintain a data table that track all instances of formatting within a document in association with the location of each formatting instance within the document. The data table is referred to as a PLC and includes a list of "runs". Each run is the smallest chunk of text within the document having the same formatting properties. The PLC also maintains the location of that run within the document. In short, the FCC maintains a table of formatting instances within a particular document in association with the location of each instance. The FCC component operates in a pseudo-server capacity with the other three components of the invention operating in pseudo-client capacities. That is, the three components described below request and receive formatting information from the FCC.

The first of the client components is the Formatting Pane. The Formatting Pane is a tool by which a user can more easily add formatting to a document. The Formatting Pane provides a readily accessible log of all formatting in the document. The log is maintained in a user interface (UI) that can be displayed in the same window as a document being edited. The log is updated in real-time as a user formats the document. The log allows the user to perform various functions on existing formatting and to replace formatting with other formats to make a document formatting more consistent.

The Formatting Pane can be invoked by pressing a button on a toolbar in a document editor. The Formatting Pane will appear and provide a visual representation of the log of all formatting within the document. Clicking on an entry in the Formatting Pane will apply that formatting to selected text within the document. In addition, each entry in the Formatting Pane has a sub menu that can be invoked by the user. The sub-menu enables the user to perform various functions for a given format.

The first menu item within the sub-menu is "Select All". The Select All item will highlight all of the instances of the selected formatting within the document. This enables the user to modify the formatting of all highlighted instances with a single change to the Formatting Pane log entry. The sub-menu also includes a "New Style" item that permits the user to create a style with the set of formatting parameters identified by the Formatting Pane log entry. An "Update" item permits the user to make changes to the formatting set of a previously defined style. A "Modify" item allows the user to modify the instances of the selected Formatting Pane entry in the document and to create a new style including the set of formatting properties so modified. Finally, a "Delete" item permits the user to remove a style from a document and revert the instances previously associated with the deleted style to a "normal" style (i.e., some default style). The Delete item also permits the user to remove the Formatting Pane entry and any direct formatting associated with the entry.

Notably, all Formatting Pane entries can be associated with a style including paragraph styles, table styles, character styles, and list styles. Each Formatting Pane entry that is associated with a style is identified with an icon that identifies the category of style to which that formatting entry is associated.

The second component of the invention is the format checker component. The format checker component operates to determine a minority case of formatting within a particular document. For example, where the user has consistently used a particular kind of direct formatting throughout the document, the format checker component will locate one or more portions of a document with formatting that that is inconsistent

with the majority of formatting instances within the document. The format checker component can offer the user an opportunity to modify the minority case formatting to make it consistent with the majority case formatting. The user will then be provided an opportunity to accept or ignore the suggestions of the format checker component. In an alternative embodiment, the format checker component can identify minority cases by some visual means such as a squiggled line under the minority case region of the document.

Finally, the third component is a bullets and numbering component (BNC). When the user selects to apply bullets and/or numbering in a document, the BNC utilizes the FCC to determine how bullets and/or numbering have been previously applied in the document. The current format of the bullets and/or numbering is then set to be consistent with the majority case of bullets and/or numbering formatting found in the document. If no majority case exists, then the default formatting can be applied, based on either the user's identified preferences or some default formatting defined by the application.

The various aspects of the present invention may be more clearly understood and appreciated from a review of the following detailed description of the disclosed embodiments and by reference to the drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a computer system that provides the operating environment for an exemplary embodiment of the present invention.

Fig. 2a is a textual representation of formatting runs within a document.

Fig. 2b is a block diagram depicting the primary components of an exemplary Formatting Consistency Checker for maintaining and tracking formatting runs within an electronic document.

Fig. 3 is a block diagram depicting the interaction between the Formatting Consistency Checker and the other primary consistency components of an exemplary embodiment of the present invention.

Fig. 4a is a graphical depiction of the user interface of the Format Pane of an exemplary embodiment of the present invention.

Fig. 4b is a graphical depiction of a submenu accessible within the context of the user interface of the Format Pane of Fig. 4a.

Fig. 5 is a method for checking the text formatting consistency of a document in an exemplary embodiment of the present invention.

Fig. 6 is a method for checking the bullets and numbering formatting consistency of a document in an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

The present invention solves the problems of the prior art by providing a system and method for monitoring and enhancing the consistency of text formatting within a document. The present invention is comprised of four main components. The first component is the Format Consistency Checker (FCC). The FCC functions to build and maintain a data table that tracks all instances of formatting within a document in association with the location of each formatting instance within the document. The data table is referred to as a PLC and includes a list of "runs". Each run is the smallest chunk of text within the document having the same formatting properties. The PLC also maintains the location of that run within the document. In short, the FCC maintains a table of formatting instances within a particular document in association with the location of each instance. The FCC component operates in a pseudo-server capacity with the other three components of the invention operating in pseudo-client capacities. That is, the three components described below request and receive formatting information from the FCC.

The first of the client components is the Formatting Pane. The Formatting Pane is a tool by which a user can more easily add formatting to a document. The Formatting Pane provides a readily accessible log of all formatting in the document. The log is maintained in a User Interface that can be displayed in the same window as a document being edited. The log is updated in real-time as a user formats the

document. The log allows the user to perform various functions on existing formatting and to replace formatting with other formats to make a document formatting more consistent.

The Formatting Pane can be invoked by pressing a button on a toolbar in a document editor. The Formatting Pane will appear and provide a visual representation of the log of all formatting within the document. Clicking on an entry in the Formatting Pane will apply that formatting to selected text within the document. In addition, each entry in the Formatting Pane has a sub menu that can be invoked by the user. The sub-menu enables the user to perform various functions for a given format.

The first menu item within the sub-menu is "Select All". The Select All item will highlight all of the instances of the selected formatting within the document. This enables the user to modify the formatting of all highlighted instances with a single change to the Formatting Pane log entry. The sub-menu also includes a "New Style" item that permits the user to create a style with the set of formatting perimeters identified by the Formatting Pane log entry. An "Update" item permits the user to make changes to the formatting set of a previously defined style. A "Modify" item allows the user to modify the instances of the selected Formatting Pane entry in the document and to create a new style including the set of formatting properties so modified. Finally, a "Delete" item permits the user to remove a style from a document and revert the instances previously associated with the deleted style to a "normal" style (i.e., some default style). The Delete item also permits the user to remove the Formatting Pane entry and any direct formatting associated with the entry.

Notably, all Formatting Pane entries can be associated with a style including paragraph styles, table styles, character styles, and list styles. Each Formatting Pane entry that is associated with a style is identified with an icon that identifies the category of style to which that formatting entry is associated.

The second component of the invention is the format checker component. The format checker component operates to determine a minority case of formatting within a particular document. For example,

where the user has consistently used a particular kind of direct formatting throughout the document, format checker component will locate one or more portions of a document with formatting that that is inconsistent with the majority of formatting instances within the document. The format checker component can offer the user an opportunity to modify the minority case formatting to make it consistent with the majority case. The user will then be provided an opportunity to accept or ignore the suggestions of the format checker component. In an alternative embodiment the format checker component can identify minority cases by some visual means such as a squiggled line under the minority case region of the document.

Finally, the third component is a bullets and numbering components (BNC). When the user selects to apply bullets and/or numbering in a document, the BNC utilizes the FCC to determine how bullets and/or numbering have been previously applied in the document. The current format of the bullets and/or numbering is then set to be consistent with the majority case of bullets and/or numbering formatting found in the document. If no majority case exists, then the default formatting can be applied, based on either the user's identified preferences or some default formatting defined by the application.

The various aspects of the present invention may be more clearly understood and appreciated from a review of the following detailed description of the disclosed embodiments and by reference to the drawings and claims.

An Exemplary Operating Environment

Fig. 1 and the following discussion are intended to provide a brief, general description of a suitable computing environment in which the invention may be implemented. While the invention will be described in the general context of an application program that runs on an operating system in conjunction with a personal computer, those skilled in the art will recognize that the invention also may be implemented in combination with other program modules. Generally, program modules include routines, programs, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Moreover,

those skilled in the art will appreciate that the invention may be practiced with other computer system configurations, including hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, minicomputers, mainframe computers, and the like. The invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

With reference to Fig. 1, an exemplary system for implementing the invention includes a conventional personal computer **20**, including a processing unit **21**, a system memory **22**, and a system bus **23** that couples the system memory to the processing unit **21**. The system memory **22** includes read only memory (ROM) **24** and random access memory (RAM) **25**. A basic input/output system **26** (BIOS), containing the basic routines that help to transfer information between elements within the personal computer **20**, such as during start-up, is stored in ROM **24**. The personal computer **20** further includes a hard disk drive **27**, a magnetic disk drive **28**, e.g., to read from or write to a removable disk **29**, and an optical disk drive **30**, e.g., for reading a CD-ROM disk **31** or to read from or write to other optical media. The hard disk drive **27**, magnetic disk drive **28**, and optical disk drive **30** are connected to the system bus **23** by a hard disk drive interface **32**, a magnetic disk drive interface **33**, and an optical drive interface **34**, respectively. The drives and their associated computer-readable media provide nonvolatile storage for the personal computer **20**. Although the description of computer-readable media above refers to a hard disk, a removable magnetic disk and a CD-ROM disk, it should be appreciated by those skilled in the art that other types of media which are readable by a computer, such as magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, and the like, may also be used in the exemplary operating environment.

A number of program modules may be stored in the drives and RAM **25**, including an operating system **35**, one or more document editors **36**, an Format Consistency Checker **38**, and one or more format consistency components, such as Format Pane **39** which could be

incorporated within document editor **36** or Format Consistency Checker **38** for maintaining or monitoring various aspects of the formatting consistency of text in a document. It will be appreciated that Format Consistency Checker **38** and Format Pane **39** could be integrated into document editor **36**. A user may enter commands and information into the personal computer **20** through a keyboard **40** and pointing device, such as a mouse **42**. Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like. These and other input devices are often connected to the processing unit **21** through a serial port interface **46** that is coupled to the system bus, but may be connected by other interfaces, such as a game port or a universal serial bus (USB). A monitor **47** or other type of display device is also connected to the system bus **23** via an interface, such as a video adapter **48**. In addition to the monitor, personal computers typically include other peripheral output devices (not shown), such as speakers or printers.

The personal computer **20** may operate in a networked environment using logical connections to one or more remote computers, such as a remote computer **49**. The remote computer **49** may be a server, a router, a peer device or other common network node, and typically includes many or all of the elements described relative to the personal computer **20**, although only a memory storage device **50** has been illustrated in Figure 1. The memory storage device **50** may include stored program modules that are executable by the remote computer **49**. The logical connections depicted in Figure 1 include a local area network (LAN) **51** and a wide area network (WAN) **52**. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet.

When used in a LAN networking environment, the personal computer **20** is connected to the LAN **51** through a network interface **53**. When used in a WAN networking environment, the personal computer **20** typically includes a modem **54** or other means for establishing communications over the WAN **52**, such as the Internet. The modem **54**, which may be internal or external, is connected to the system bus **23** via the serial port interface **46**. In a networked environment, program modules depicted relative to the personal computer **20**, or portions

thereof, may be stored in the remote memory storage device. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used.

An exemplary embodiment of the present invention is represented by document editors including the "MICROSOFT WORD" word processing application program, the "MICROSOFT EXCEL" spreadsheet application program, the "MICROSOFT ACCESS" database application program, and the "MICROSOFT POWERPOINT" graphical presentation application program. However, it should be understood that the present invention can be implemented by various program modules and/or application programs for use with various operating systems.

An Exemplary Document

Fig. 2a depicts an exemplary document **200** which includes formatted text. Line **202** of document **200** includes a group of text having various formatting properties. A "run" is the smallest section of text in a document sharing a particular attribute. In the case of formatting attributes, a run is a smallest section of text that shares identical formatting attributes. Runs are also referred to as "instances". Line **203** of document **200** includes four runs **204, 206, 208, and 210** sharing identical formatting properties. The runs of line **202** are separated at line **203**. Runs **204, 206, 208**, and **210** have formatting attributes that are unique from one another. However, for all of the text within a given run, the formatting attributes are consistent. The formatting attributes associated with each of runs in line **203** are depicted under their respective runs in Fig. 2a.

Runs **204, 206**, and **208** have formatting attributes associated with the default or "Normal" style. Run **210**, on the other hand, has the formatting attributes of the defined "Heading" style. The use of styles as a formatting tool is well known in the art. Moreover, the association of style names with a set of formatting attributes is also well-known in the art. The relevance of styles and direct formatting in the context of the present invention will be discussed in more detail below.

Fig. 2b depicts text within document **301**. The text is separated into runs, as described in connection with Fig. 2a. However, the

runs have been associated with a location within the document **301**. It is well known in the art that text within a document can be identified by referring to a location within the document.

Fig. 2b further depicts a formatting consistency checker (FCC) **302** which can be used to analyze a document in the background to associate runs with document locations. The FCC **302** functions to build and maintain a data table that can be used to track all instances of formatting runs within a document in association with the location of each formatting run. The data table is referred to as a PLC **304** and includes a list of runs **306**. As stated above, each run is defined as the smallest chunk of text within the document having the same formatting properties. The PLC **304** also maintains a location list **308** which associates a document location with each run in the document **301**.

The FCC **302**, therefore, maintains a table of formatting runs within a particular document in association with the location of each of the formatting runs. By analyzing the document **301** in the background, the FCC **302** updates the PLC **304** to maintain a current list of formatting runs and their associated locations. As will be described in more detail in connection with Figs. 3-6, the FCC **302** operates in a pseudo-server capacity with three other components of the present invention which operate in pseudo-client capacities. The pseudo-client components utilize the information in the PLC **304** through the FCC **302**.

Turning now to Fig. 3, the primary components of an exemplary embodiment of the present invention are depicted in block diagram format. The FCC **302** operates in a pseudo-server capacity with respect to the three sub-components of the present invention. The sub-components include a formatting pane **310**, a format checker **312**, and a bullets and numbering component **314**. As discussed above in connection with Fig. 2b, the sub-components are able to access the run **306** and location data **308** within the PLC **304** by interaction with the FCC **302**.

Specifically, the sub-components **310**, **312**, and **314** each send a "call back" request to the FCC **302** identifying the information that the sub-component seeks from the FCC **302**. In essence, the call back acts as a information filter to limit the information that is transmitted from the FCC

302 to any given sub-component. The call back request is a well known means for managing information flow between program modules.

An Exemplary Formatting Pane

The first of the pseudo-client components is the formatting pane which is depicted in Fig. 4a. The formatting pane is a tool by which a user can more easily add formatting to a document. Fig. 4a depicts a screen shot of a typical document editor **400**, such as Microsoft Word. The document **402** is displayed within a pane of the document editor **400** in a conventional manner. In an exemplary embodiment of the present invention, a formatting pane **404** is implemented within the user interface of document editor **400.** The formatting pane **404** provides a readily accessible log of all formatting in the document **402.** The log is maintained in the formatting pane **404**. The log is updated in real-time as a user formats a document. The formatting pane **404** can be invoked by pressing a button on a toolbar within the user interface of the document editor **400**. When invoked, the formatting pane appears and provides a visual representation of the log of all formatting within the document. Clicking on an entry in the formatting pane will apply that formatting to any selected text within the document.

As stated above, the log is updated and real-time. This real time updating is performed by virtue of the interaction between the formatting pane component **310** and the formatting consistency checker **302**, depicted in Fig. 3. As described above, the FCC **302** continuously analyzes the document **301** in the background and updates PLC **304**. Because the formatting pane component **310** maintains a call back request with the FCC **302**, the updated information is made available to formatting pane component **310**.

Returning now to Fig. 4a, the entries within the formatting pane **404** can be highlighted by the user. When highlighted, the entry will also highlight the text within the document that has the formatting properties identified by the formatting pane entry. For example, entry **406** has been highlighted and identifies the formatting property of "bold" when formatting pane entry **406** is highlighted, all runs within document **402** will be highlighted that have the set of formatting properties identical

to that of formatting pane entry **406**. In this example, all bold text not having other formatting properties will be highlighted within document **402**.

If a run within the document **402** is the only instance of a particular set of formatting properties, that set of formatting properties will be represented in the formatting pane **410**. However, if that run is deleted, and no other runs exist in document **402** having the same formatting properties, the formatting pane entry corresponding to the deleted run will be removed from the formatting pane log.

In the event that a formatting pane entry exists that includes an identical set of formatting properties as a defined style, the formatting pane entry may be automatically changed to reflect the style name. This style name would be listed in the formatting pane **404** instead of the list of formatting properties associated with the formatting pane entry. For example, formatting pane entry **408** is associated with the (header style). Additionally, each formatting pane can be identified as a paragraph style, table style, character style, or list style. These types of styles are well known in the art and are used to define sets of formatting properties that can be associated with paragraphs, tables, characters, and lists, respectively. Each formatting pane entry that is associated with a style category is identified as such with an icon **410** that identifies the style category to which that formatting entry is associated.

Each formatting pane entry has an associated sub-menu. The sub-menu is accessed by button **412**.

Turning now to Fig. 4b, and exemplary submenu **450** is depicted. The submenu contains menu items **452-460**. The first menu item within the submenu **450** is the "select all" menu item **452**. The selected all menu item **452** will highlight all of the runs in the document **402** that have a formatting properties set identical to the formatting pane entry to which the submenu **450** is associated. This enables the user to modify the formatting of all highlighted runs with a single change to the formatting pane entry.

The submenu **450** also includes a "new style" menu item **454** that permits the user to create a new style. The new style that is created

will have the set of formatting perimeters identified by the formatting pane entry to which the submenu **450** is associated.

The submenu **450** includes an "update" menu item **456** that enables the user to make changes to the formatting set of a previously defined style. A "modified" menu item **458** enables the user to modify the runs of the selected formatting pane entry and to create a new style having the set of formatting properties so modified.

A "delete" menu item **460** enables the user to remove a style from a document and to revert the runs previously associated with the deleted style to a "normal" style (i.e. sum default style). The delete menu item **460** also permits the user to remove the formatting pane entry and any direct formatting associated with the entry that has been applied to one or more runs within the document.

An Exemplary Format Checker Component

In an exemplary embodiment of the present invention, a format checker component is provided to enhance formatting consistency within a particular document. For example, where a user has consistently used a particular kind of direct formatting throughout the document, the Format Checker Component **312** will locate one or more portions of the document having formatting that is inconsistent with the majority of formatting runs in the document. The Format Check Component **312** can provide the user with an opportunity to modify the identified minority case of formatting in order to make the minority case consistent with the majority case. The user can then be provided with an opportunity to accept or ignore the suggestions of the Format Checker Component **312**. In an alternative embodiment of the present invention, the Format Checker Component **312** can visually identify minority cases to the user. For example, the Format Checker Component **312** could highlight the text that includes formatting that is inconsistent with the majority case previously identified.

In an exemplary embodiment of the present invention, inconsistencies are determined by comparing one or more runs within the document to a set of consistency rules. For example, a rule may define an inconsistency as a variation of font sizes greater than one point. Thus,

consistency rules can be used to focus the Format Checker Component **312** on meaningful inconsistencies. Less meaningful inconsistencies, such as slight variations in point size, can be ignored by the use of the consistency rules set.

Turning now to Fig. 5, a flow chart **500** depicts a method for checking the consistency of formatting runs within a document of an exemplary embodiment of the present invention. The method starts at step **502** and proceeds to step **504**. At step **504**, the FCC **302** determines the formatting runs that exist in the document, as described in more detail in connection with Figs. 2b and 3. The method then proceeds to step **506** and the runs identified by the FCC **302** are compared to consistency rules to determine whether any meaningful inconsistencies exist. The method proceeds to decision block **508** at which a determination is made as to whether any format and consistencies were found by the comparison of step **506**. If no inconsistencies are found, the method branches to step **504** and the FCC **302** continues analyzing the document in the background.

Returning to decision block **508**, if an inconsistency is found, the method branches to step **510** and the minority cases and majority cases are identified. A majority case is a set of formatting properties that is associated with the most runs in the document having an analogous formatting property. The minority case represents the runs within document that are inconsistent with the majority case as the inconsistency is defined by the consistency rules. For example, if a document is primarily comprised of runs having a point size of 12, a small number of runs having a point size of 5 may be identified by the Format Checker Component **302** as a minority case.

Returning now to Fig. 5, the method proceeds from step **510** to step **512** and the minority cases are revealed to the user as described above. At step **512**, the user can also be offered a suggestion that may include the minority case. The method then proceeds to decision block **514** wherein a decision is made as to whether the suggestion was accepted by the user. If the suggestion is not accepted by the user, then the method branches to step **504**, as described above. If the suggestion is accepted by the user, the method branches to step **516** and the minority case is

reformatted to the suggested format. The method then proceeds to step **504**, through connector A.

An Exemplary Bullets and Numbering Checking Component

The third component of an exemplary embodiment of the present invention is a bullet and numbering component (BNC). The bullet and numbering component is operative to increase consistency among bullets and/or numbering in a document. When a user selects to apply bullets and/or numbering in a document, the bullet and numbering component utilizes the information provided by the FCC **302** to determine how bullets and/or numbering have been previously applied in the document. The current format of the bullets and/or numbering is inset to be consistent with the majority case of bullets and/or numbering formatting found in the document. If no majority case exists, then the default formatting can be applied. The default formatting for bullets and/or numbering may be based either on the users identified preferences or on some default formatting defined by the document editor. Turning now to Fig. 6, a method for increasing bullets and/or numbering consistency is depicted. The method starts at step **602** and proceeds to step **604**. At step **604**, the user selects add bullets or numbering to the document. The method then proceeds to decision block **606** in which a determination is made as to whether other instances of bullets or numbering exist in the document. If no other instances exist, then the method branches to step **612** and the default bullets and/or numbering format is applied. The method then proceeds to step **602** and starts over.

If, on the other hand, other instances of bullets and/or numbering exist within the document, the method branches from decision block **606** to step **608**. At step **608**, the majority case of existing bullets and/or numbering formatting is identified. The method then proceeds to step **610** and the majority case formatting is applied to the current bullets and/or numbering format. The method then proceeds to step **602**, via connector B.

The present invention has been described in relation to particular embodiments which are intended in all respects to be illustrative rather than restrictive. Alternative embodiments will become

apparent to those skilled in the art to which the present invention pertains without departing from its spirit and scope. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing description.

CLAIMS

We claim:

1. A system for improving formatting consistency within a document comprising:

a formatting consistency checker operative for storing a formatting run in association with the location of the formatting run within a document; and

a format checker operative to retrieve run location data from the format consistency checker, to determine a minority formatting instance, and to report a formatting inconsistency to a user.

2. The system of Claim 1, wherein the formatting consistency checker comprises a data table to receive a formatting run in association with the location of the formatting run within a document.

3. The system of Claim 1, wherein the formatting run comprises text within the document sharing one or more similar formatting properties.

4. The system of Claim 1, wherein the format checker is further operative to provide the user with an opportunity to modify the formatting inconsistency.

5. The system of Claim 1, wherein the format checker is further operative to visually identify a formatting inconsistency to the user.

6. The system of Claim 1, wherein the format checker comprises a set of consistency rules to compare run location data to and to determine a minority inconsistency.

7. The system of Claim 1, further comprising a formatting pane operative to display a log of all formatting within a document, to display a formatting instance provided by the format checker, and to

provide an interface for a user to select a particular formatting instance provided by the format checker.

8. The system of Claim 7, wherein the formatting pane further comprises a submenu operative to modify the formatting of all formatting instances within the document in response to a user entry to the formatting pane.

9. The system of Claim 7, wherein the formatting pane further comprises a submenu operative to create a new style or set of formatting parameters within a style corresponding to a user selection of a particular formatting instance in the formatting pane.

10. The system of Claim 7, wherein the formatting pane further comprises a submenu operative to change a set of formatting parameters to a previously defined style in response to a user entry to the formatting pane.

11. The system of Claim 7, wherein the formatting pane further comprises a submenu operative to modify formatting runs of a selected formatting pane, and to create a new style having the set of formatting properties corresponding to the modified formatting runs.

12. The system of Claim 7, wherein the formatting pane further comprises a submenu operative to remove a style from a document and to revert to runs previously associated with the deleted style, and further operative to remove a user's entry in the formatting pane and any formatting associated with the entry that has been applied to one or more formatting runs within the document.

13. The system of Claim 1, further comprising a bullets and numbering component operative to receive a user addition of bullets and/or numbering to the document, to determine whether other instances of bulleting and/or numbering exist in the document, and to identify a

majority case of prior instances of bulleting and/or numbering within the document.

14.The system of Claim 13, wherein the bullets and numbering component is further operative for applying the majority case of bulleting and/or numbering to the user addition of bullets and/or numbering in the document.

15.The system of Claim 13, wherein the bullets and numbering component is further operative for applying a predefined default format of bulleting and/or numbering to the user addition of bullets and/or numbering in the document.

16. A system for checking format consistency in a document, comprising:

a format consistency checker operative to store a formatting run in association with the location of the formatting run within a document;

a formatting pane in communication with the format consistency checker, operative to provide an accessible log of all formatting within the document, and further operative to provide a user interface for a user to input a format selection to the document;

a format checker in communication with the format consistency checker, operative to retrieve run location data from the format consistency checker to determine a minority case of formatting within the document, and further operative to display the minority case to the user; and

a bullets and numbering component in communication with the format consistency checker, operative to determine a majority case for bullets and/or numbering formatting previously applied in the document, and further operative to display the majority case of bullets and/or numbering formatting to the user.

17. A method for improving formatting consistency within a document comprising the steps of:

determining a formatting run within a document;

comparing the formatting run to a consistency rule set; and

determining whether an inconsistency with the consistency rule set exists.

18. The method of Claim 16 further comprising the steps of:

in response to determining that an inconsistency exists, identifying a minority case or a majority case.

19. The method of Claim 17 further comprising the steps of:

revealing the minority case or majority case to a user; and

offering a suggested case format to the user.

20. The method of Claim 17 further comprising the steps of :

determining whether the suggested case format is accepted by the user;

in response to determining that the suggested case format is accepted,

reformatting the minority case to the suggested case format.

21. The method of Claim 17 wherein the suggested case format is the majority case.

22. The method of Claim 16 wherein the formatting runs comprise text sharing the same formatting attributes.

23. The method of Claim 17, wherein the majority case comprises a set of formatting properties that is associated with the most formatting runs in the document having an analogous formatting property.

24.The method of Claim 17, wherein the minority case comprises a set of formatting properties that is inconsistent with the majority case as the inconsistency is defined by the consistency rule set.

25. A method for improving formatting consistency within a document comprising the steps of:

receiving a user selection of bullets and/or numbering within a document;

determining whether other instances of bulleting and/or numbering exists within the document; and

identifying a majority case of bulleting and/or numbering within the document.

26. The method of Claim 24, further comprising the steps of:

applying the majority case of bulleting and/or numbering within the document to the user selection.

27. The method of Claim 24, further comprising the steps of:

applying a default format of bullets and/or numbering to the user selection within the document.

SYSTEM AND METHOD FOR MAINTAINING TEXT FORMATTING CONSISTENCY WITHIN AN ELECTRONIC DOCUMENT

ABSTRACT OF THE DISCLOSURE

A Format Consistency Checker (FCC) is provided for monitoring and enhancing text formatting within a document. The FCC is operative to build and maintain a data table that tracks all instances of formatting within a document in association with the location of each formatting instance within the document. The data table is referred to as a PLC and includes a list of "runs". The FCC maintains a table of formatting instances within a particular document in association with the location of each instance. The FCC component operates in combination with three other consistency components. The first of the components is the Formatting Pane which is a tool by which a user can more easily add formatting to a document. The Formatting Pane provides a readily accessible log of all formatting in the document. The log is maintained in a user interface (UI) that can be displayed in the same window as a document being edited. The second component of the invention is the format checker component which operates to determine a minority case of formatting within a particular document and to offer a user an opportunity to modify the minority case formatting to make it consistent with the majority case. The third component is a bullets and numbering component which determines how bullets and/or numbering have been previously applied in the document. The current format of the bullets and/or numbering is then set to be consistent with the majority case of bullets and/or numbering formatting found in the document.

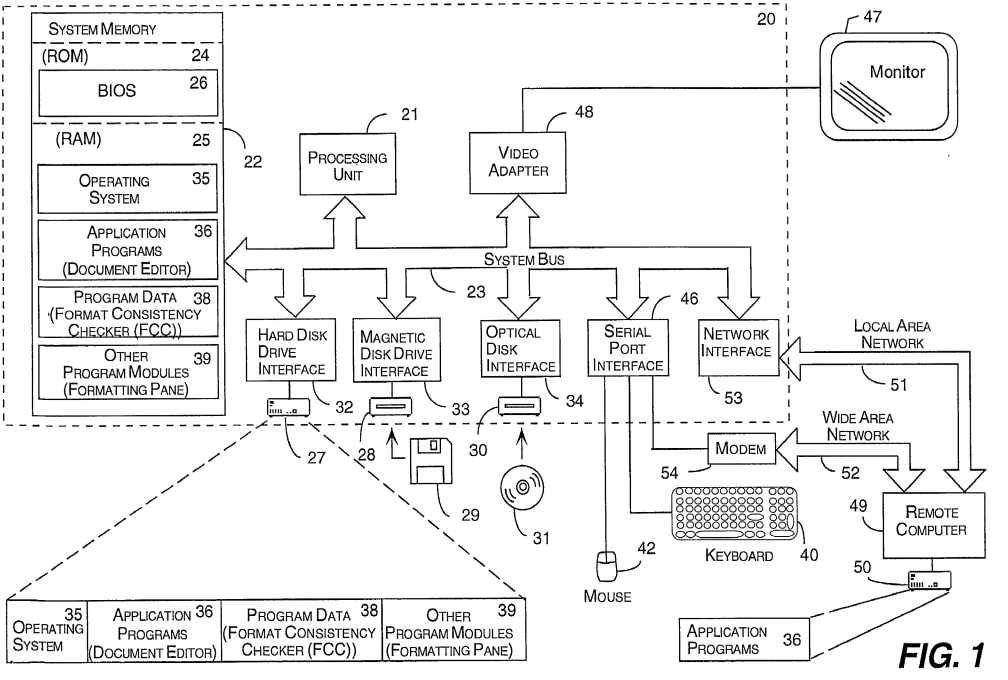

20
47
Monitor
System Memory
(ROM) 24
BIOS 26
(RAM) 25
22
Operating System 35
Application Programs 36
(Document Editor)
Program Data 38
(Format Consistency Checker (FCC))
Other Program Modules 39
(Formatting Pane)
21
Processing Unit
48
Video Adapter
System Bus
23
46
Hard Disk Drive Interface
Magnetic Disk Drive Interface
Optical Disk Interface
Serial Port Interface
Network Interface
Local Area Network
51
53
32
33
34
27
28
30
Modem
54
52
Wide Area Network
29
31
49
Remote Computer
Keyboard
40
42
Mouse
50
Application Programs 36
35 Operating System
Application 36 Programs (Document Editor)
Program Data 38 (Format Consistency Checker (FCC))
Other 39 Program Modules (Formatting Pane)

FIG. 1

DOCUMENT 200

202 Now is the time **for all good men** ***to come to the aid*** ***<u>of their country</u>***

203 Now is the time	**for all good men**	***to come to the aid***	***<u>of their country</u>***
204	206	208	210
not bold not italics no underline Times New Roman Point size = 20 Style : Normal	bold not italics no underline Times New Roman Point size = 20 Style : Normal	bold italics no underline Times New Roman Point size = 20 Style : Normal	bold italics single underline Times New Roman Point size = 20 Style : Heading

Fig. 2a

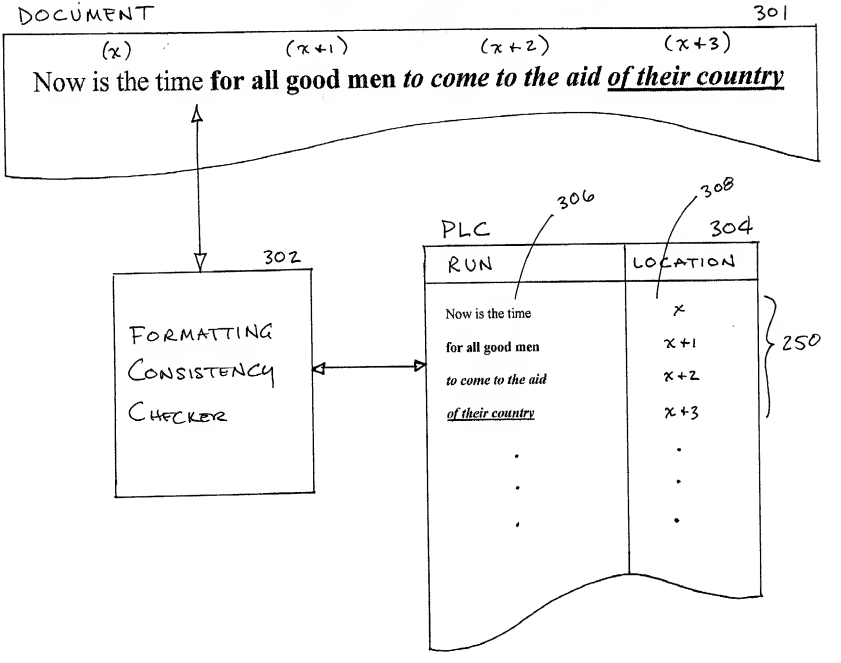

DOCUMENT
301
(x)
(x+1)
(x+2)
(x+3)
Now is the time for all good men to come to the aid of their country
302
FORMATTING
CONSISTENCY
CHECKER
306
308
PLC
304
RUN
LOCATION
Now is the time
for all good men
to come to the aid
of their country
x
x+1
x+2
x+3
250

FIG. 2b

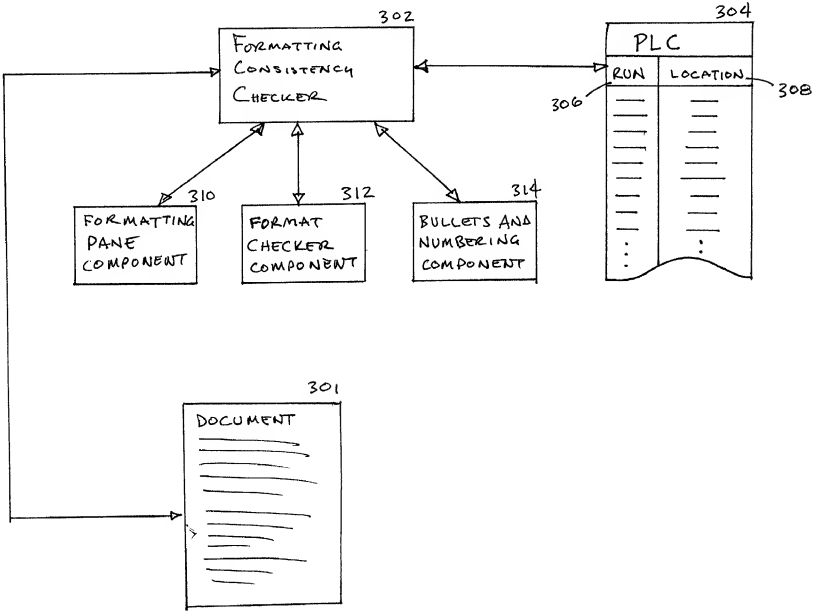
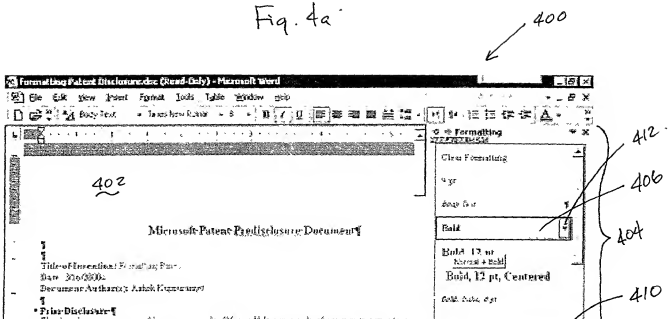

302
FORMATTING CONSISTENCY CHECKER
304
PLC
RUN
LOCATION
306
308
310
FORMATTING PANE COMPONENT
312
FORMAT CHECKER COMPONENT
314
BULLETS AND NUMBERING COMPONENT
301
DOCUMENT

FIG.3

Fig. 4a


400
Formatting Patent Disclosure.doc (Read-Only) - Microsoft Word
File Edit View Insert Format Tools Table Window Help
Formatting
Clear Formatting
Bold
Bold, 12 pt, Centered
Bold, Red
Footer
Header
Microsoft Patent Disclosure Document
Prior Disclosure
The Legal Advisory Council reserves a 30 minute demonstration of the feature on Microsoft or the members of the Legal Advisory Council signed non-disclosure agreements.
Start
Windows Task Manager
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404
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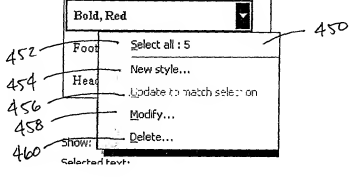
Bold, Red
Foot
Hea
Select all : 5
New style...
Update to match selection
Modify...
Delete...
Show:
Selected text
450
452
454
456
458
460

Fig. 4b

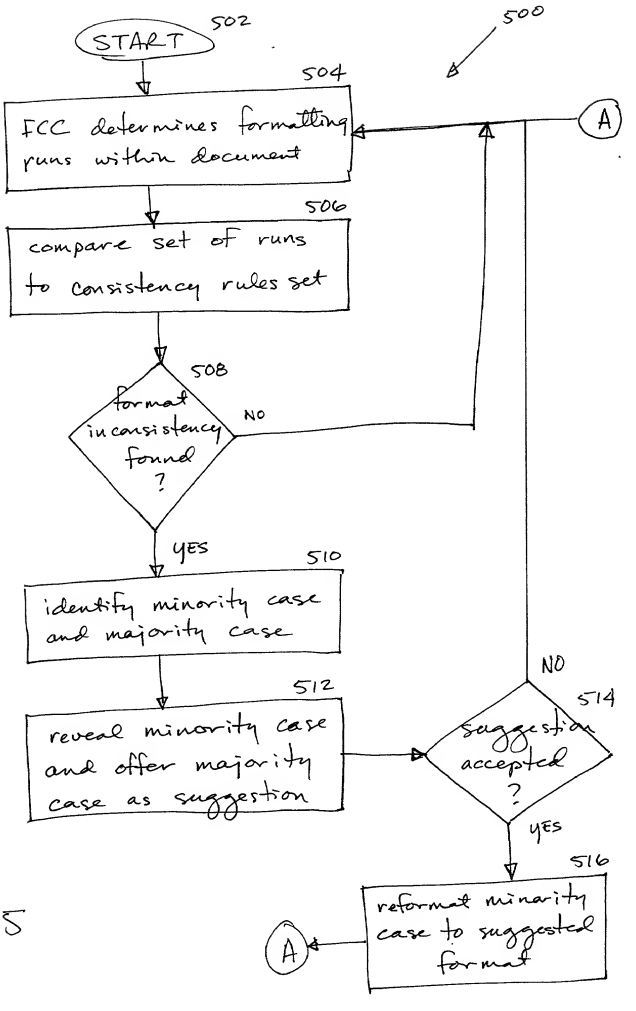
500
START
502
504
FCC determines formatting runs within document
A
506
compare set of runs to consistency rules set
508
format inconsistency found ?
NO
YES
510
identify minority case and majority case
512
reveal minority case and offer majority case as suggestion
NO
514
suggestion accepted ?
YES
516
reformat minority case to suggested format
A

FIG. 5

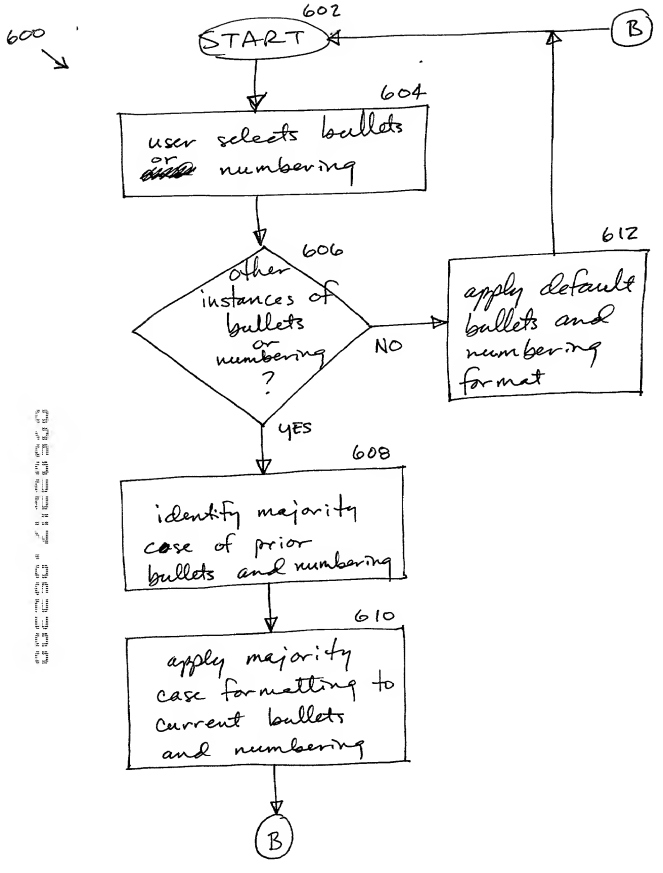
600
602
START
B
604
user selects bullets or numbering
606
other instances of bullets or numbering ?
NO
YES
612
apply default bullets and numbering format
608
identify majority case of prior bullets and numbering
610
apply majority case formatting to current bullets and numbering
B

FIG. 6